Original Article

Aminotransferase in Patients of Type 2 Diabetes Mellitus

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ABSTRACT

Objective: To estimate the frequency of raised ALT in T2DM patients of Quetta and evaluate the risk factors.
Study Design: A cross-sectional, prospective study
Place and Duration of Study: This study was conducted at the conducted in the department of Internal Medicine, Sandeman Provincial Hospital Quetta for a period of six months from Jan to June 2015.
Materials and Methods: The study was approved from institutional review board. Patients of both genders diagnosed type 2 diabetes mellitus were included after attaining informed consent. Serum ALT levels were done for all patients in the hospital laboratory. Demographic and clinical characteristics were recorded. Data was entered and analyzed using SPSS v. 18.0.
Results: There were 144 patients in the study –37 (25.7%) women and 107 (74.3%) men. Their mean age was 43.8 ± 7.2 years. Elevated ALT levels were seen in 30 (20.8%) patients of T2DM. Patient gender, body mass index, and duration of diabetes were not statistically related to elevated ALT levels in patients of T2DM ($p>0.05$).
Conclusion: Serum alanine aminotransferase was frequently high in patients of type 2 diabetes mellitus. It was not associated with gender, body mass index, or duration of diabetes.

Key Words: serum alanine aminotransferase, T2DM

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INTRODUCTION

Diabetes mellitus is a glitch of pancreas where it doesn't deliver sufficient insulin or the body has issue in utilizing insulin. Type 2 diabetes mellitus (T2DM), in which an individual isn't reliant on insulin, is more regularly detailed than type I diabetes mellitus in which an individual is totally subject to insulin. As per World Health Organization (WHO) in excess of 220 million individuals are experiencing diabetes mellitus around the world, 80% diabetic patients are from agricultural nations and consistently 5% of passings trait to diabetes mellitus [1,2].

T2DM carries with itself a range of metabolic dysfunctions including liver brokenness. Patients with T2DM are much of the time seen with raised liver proteins (RLEs); which might possibly show clinically [3]. The association of diabetes mellitus has been grounded with Non-Alcoholic Fatty Liver Disease (NAFLD) [4].

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Insulin obstruction is the fundamental guilty party in both the sicknesses. Diabetic patients with RLEs have been a significant talk for the two doctors and examiners. If not oversaw successfully during the underlying stages, the drawn out inconveniences and outcomes or NAFLD can have critical weight on persistent visualization and healthcare cost [5].

Serum levels of liver transaminases backhanded reflect liver capacity. RLE are found in liver brokenness and NAFLD[6]. Raised serum Gamma-Glutamyl Transferase (GGT), Aspartate Aminotransferase (AST), and Alanine Aminotransferase (ALT) levels have been accounted for to increment of hazard of T2DM and cardiovascular and metabolic brokenness [7]. NAFLD is additionally connected with heftiness, hypertension (HTN), and dyslipidemia which are likewise essentially related to metabolic condition and insulin opposition [8]. In the western populace, where 35% of healthy non-comorbid people have NAFLD, the frequency ascends to 75-90% in high-hazard gathering of diabetic and stout people [9]. NAFLD is a main source of persistent liver infection which thus is additionally related to metabolic disorder [9]. Likewise, T2DM patients with NAFLD with or without RLE are at higher danger of miniature and full scale vascular entanglements [10].

There is still little proof of association liver capacity in diabetic patients from Pakistan. In a new observational examination from South Pakistan, 35% of diabetic patients had raised ALT which was genuinely related to male sex, and higher serum fatty substances yet no related to hemoglobin A1c (HbA1c), cholesterol, high thickness lipoproteins (HDL), and low thickness lipoproteins (LDL) [11]. We intended to assess the

recurrence of brought ALT up in T2DM patients of Quetta.

MATERIALS AND METHODS

A cross-sectional, prospective study was conducted in the department of internal medicine, Sandeman Provincial Hospital Quetta. The study was conducted for six months after approval from the institutional review board. All patients were only included after attaining informed consent.

The investigation test size was Sample size was determined utilizing World Health Organization (WHO) test size mini-computer. With a certainty level of 95%, expected recurrence of raised ALT 10.4% [12], supreme accuracy 5%, the example size blocked out to be 144. Non likelihood back to back inspecting method was adjusted. Patients of the two sexual orientations analyzed sort 2 diabetes mellitus were welcome to take an interest. Patients with history of liquor utilization, clinical or biochemical proof of viral or immune system hepatitis, essential biliary cirrhosis, hemochromatosis, Wilson's illness, or some other hepatic sickness were rejected from the investigation.

Patients satisfying consideration and prohibition standards were selected for concentrate in the wake of depicting the investigation convention and educated composed assent was taken by the analyst. Secrecy in regards to their clinical and non-clinical subtleties was kept up. A semi-organized proforma was built to record patient data. It incorporated their age, sex, body weight, tallness, weight file (BMI) [weight in kg/(stature in meter)], and their blood pressures. Serum ALT levels were accomplished for all patients in the clinic research center. Serum ALT > 35 IU/L was taken as raised in this investigation [11].

Data was entered and dissected with the assistance of measurable bundle for sociologies (SPSS v. 18.0). Mean and standard deviation (SD) was processed for quantitative factors like age, weight, tallness, circulatory strain, BMI, ALT level and length of diabetes. Recurrence and rate were introduced for subjective factors like sex and raised ALT levels. The outcomes were introduced as tables and diagrams. The impact modifiers were dealt with by delineation based on sex, BMI and length of diabetes mellitus.

RESULTS

There were 144 patients included in the study. There were 37 (25.7%)women and 107 (74.3%) men. The mean age of the study sample was 43.8 ± 7.2 years (range: 26-50 years). Their demographic and clinical characteristics are shown in table 1.

Table No.1: Demographic and clinical characteristics of the study participants (N=144)

Patient characteristics	Frequency n (%)	Mean ± SD
Gender		
Male	107(74.3%)	—
Female	37 (25.7%)	—
Age, years	—	43.8 ± 7.2
Duration of diabetes mellitus, years	—	9.4 ± 4.4
Less than 10 years	92 (63.9%)	
10 years or more	52 (36.1%)	
Body weight, kg	—	62.4 ± 14.3
Height, cm	—	157.8 ±18.0
Body mass index, kg/m^2	—	25.4 ± 4.5
Less than 30	101(70.1%)	
30 or more	43 (29.9%)	
Systolic blood pressure, mmHg	—	124.6 ±19.1
Diastolic blood pressure, mmHg	—	82.9 ±14.2
Serum alanine aminotransferase (ALT), IU/L	—	41.4 ± 16.2
ALT raised	30 (20.8%)	—
ALT normal	114(79.2%)	—

As seen in table 1, 30 (20.8%) patients of T2DM in our study had elevated ALT levels. Serum ALT levels were then compared with patient characteristics as shown in table 2. It is evident from table 2 that patient gender, body mass index, and duration of diabetes were not statistically related to elevated ALT levels in patients of T2DM.

Table No.2: Comparison of serum ALT levels with patient gender, body mass index, and duration of diabetes (N=144)

Patient characteristics	Serum alanine aminotransferase (ALT), IU/L		P value
	Raised (n=30; 20.8%)	Normal(n=114; 79.2%)	
Gender			
Male	24 (80%)	83 (72.8%)	0.42
Female	6 (20%)	31 (27.2%)	
Body mass index, kg/m^2			
Less than 30	24 (80%)	77 (67.5%)	0.18
30 or more	6 (20%)	37 (32.5%)	
Duration of diabetes mellitus, years			
Less than 10 years	17 (56.7%)	75 (65.8%)	0.35
10 years or more	13 (43.3%)	39 (34.2%)	

DISCUSSION

Twenty percent diabetic patients in our study had elevated ALT which was not related to their gender, BMI, or duration of diabetes. In spite of nearby confirmations, our examination announced less diabetic patients with raised ALT. In a new review investigation from Karachi, 35% members had raised ALT [11]. In another examination from Lahore, 82% diabetic patients had ALT >42 IU/L when contrasted with just 18% non-diabetics; in any case, the distinctions were not huge [13]. Ahmed et al. revealed that their diabetic patients had a mean ALT level of 76.94 ± 35.9 IU/L [14] when contrasted with 41.4 ± 16.2 IU/L in our report. In their examination test, 84% had ALT <100 IU/L and 14% had alt >100 IU/L [14]. In an Indian examination, mean ALT has been pretty much as high as 293.2 ± 42.54 IU/L and was essentially higher than non-diabetic gathering [15]. Provincial data has additionally revealed the recurrence of brought ALT up in diabetic patients. These incorporate 10.4% from Iran [16] and Jordan [12], 18.5% in Myanmar [17], 40% in Ethopia [18], and 16% in Italy [19].

Patient sex, BMI, and term of diabetes were not related with their ALT levels in our investigation. Be that as it may, a few associations are found in the writing. Diabetic patients with higher ALT were guys, somewhat more youthful, and had higher fatty oils (TGs) [11]. In a different investigation, diabetic patients with raised ALT had a chances proportion (OR) =1.57 for raised TGs as well as =1.47 for augmented midriff boundary [19]. In a Jordanian report, male sexual orientation had an OR of 2.35 for raised ALT, high abdomen perimeter OR =1.9, OR =12.4 for patients matured 25-45years, and OR=1.7 for non-insulin use [12].

Other than ALT, GGT is additionally altogether connected with diabetes. It very well might be anticipated by expanded abdomen bigness, BMI, hypertension, raised TGs, and low high-thickness lipoproteins [20]. Liver proteins including ALT and GGT are proxy indicators of liver injury. RLE signal fundamental hepatic steatosis [21]. Long haul diabetes and its complexities bring about enzymatic variations, which is the reason RLE are not generally related to fundamental liver harm. There is helpless association of disturbed liver proteins with the histological profile of liver [15]. In an examination with T2DM patients having ordinary serum ALT levels, as numerous as 56% had NAFLD and half has non-alcoholic steatohepatitis (NASH) [22]. RLEs can't be the lone solid indicator of hepatic injury in diabetic patients. Connection with broad liver capacity tests and radiological and histological confirmations are urgent [15].

CONCLUSION

Serum alanine aminotransferases are frequently high in patients of type 2 diabetes mellitus. However, there was no association with gender, body mass index, or duration of diabetes. Isolated elevated ALT has little value in predicting liver injury in diabetes patients. Supporting radiological and histological evidences hold great value.

Author's Contribution:

Concept & Design of Study:	Kaleemullah Kakar
Drafting:	Gulandam, Maria Abid
Data Analysis:	Maria Abid, Mohammed Atif Gulzar
Revisiting Critically:	Kaleemullah Kakar, Gulandam
Final Approval of version:	Kaleemullah Kakar

Conflict of Interest: The study has no conflict of interest to declare by any author.

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